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## (54) Chip card allowing remote identification.

(57) The invention relates to a chip card with contacts according to ISO standard 7816 and/or a contactless chip card according to the prospective standard ISO 10536. The data information from the memory of the present chip card or a part thereof can be read out at a distance of tens of centimeters via a contactless electromagnetic route, in such a manner that, with a very low energy consumption, only a part of the integrated electronic circuit of the chip card is activated, so that contactless energy supply is also possible at this distance. The data information of the same memory can be read out and written via the normal standardised operating mode of the chip card by the microprocessor present in the integrated electronic circuit of the chip card.

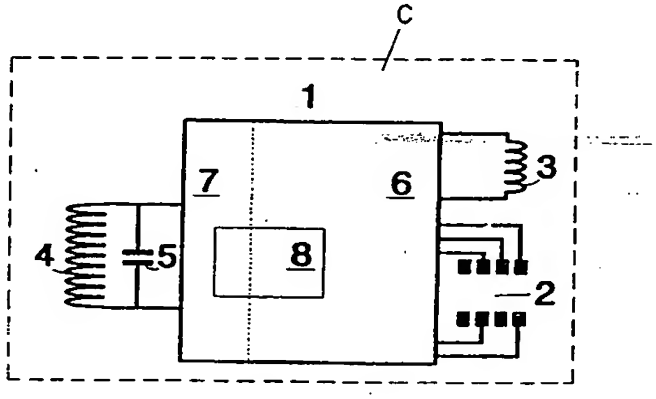


FIG. 1

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In payments, increasingly use will be made of chip cards, sometimes referred to as "smart cards". These cards comprise an electronic circuit which, in accordance with ISO standard 7816 (ISO = International Standardisation Organisation), is provided with contacts capable of effecting a connection with the external world. These contacts serve for the power supply of the electronic circuit and for the data communication from and to the card. Further, a standard ISO 10536 is in preparation for cards wherein both the power supply and the data transfer occur in contactless manner by means of an electromagnetic field. Here, the same protocol is used as with ISO 7816. In view of the relatively large energy consumption of such cards, however, the distance between the transmitter/receiver and the chip card can in that case be a few millimeters at most. In most cases, the electronic circuit of the above-mentioned cards comprises a microprocessor connected with a memory storing the program for the microprocessor as well as data, which may optionally be modifiable. Owing to the presence of internal intelligence in the card in the form of the microprocessor mentioned, it is possible to achieve a high degree of data protection. This can be done with various data encryption techniques, such as a DES algorithm (Data Encryption Standard) or the more modern RSA algorithm as developed at MIT (Massachusetts Institute of Technology). Different from the above-mentioned cards, which include a microprocessor, are cards which exclusively contain a memory wherein reading or writing occurs directly. These cards, it is true, can contain encoded information, but encryption and decryption of data are not utilized. An example of such a card is the telephone chip card with contacts, which has been introduced in many countries. In addition to the above-mentioned cards, there are cards wherein the communication with the external world does not take place through contacts but occurs in a contactless manner. Examples are the contactless identification cards as described, for instance, in applicant's patent 176404.

The contents of a memory of these cards can be read or written in a contactless manner by transferring the information in question through modulation of a typically relatively low-frequent electromagnetic carrier wave. For this purpose, amplitude, frequency or phase modulation techniques can be used. Because the power supply for these cards also occurs through the transmitter/receiver via an electromagnetic field, it is impossible, within the current standards for permissible electromagnetic field strength, to make the microprocessors used in the standardised chip cards function at greater distances and thereby to effect data encryption and decryption.

Still, for certain applications it is desired to have the possibility of contactless information transfer over a relatively great distance of some tens of centimeters, for instance 70 cm, while providing for better protection of the information. One example is the use of a contactless card in public transport. It is further desired, with regard to these applications, that use can be made of infrastructure that exists already or can be realized within a relatively short period of time, so as to enable modification of the data stored in the memories of the contactless cards mentioned. The object of the invention is to meet this need.

Hereinafter the invention will be described with reference to the accompanying single figure.

The figure schematically shows a responder card C. The card contains an electronic circuit 1 in the form of a chip comprising a microprocessor part 6 with integrated memory 8, the circuit being in contact with the external world in the standardised manner according to ISO 7816, through contacts 2, and/or in a contactless manner still to be standardised within ISO 10536 and symbolically indicated at 3 by means of a coil. The memory can contain the program for the microprocessor, which may or may not be modifiable, as well as data, which may or may not be modifiable. According to the invention, a part of the memory or the total integrated memory of the card is connected with a coil 4 or another antenna via a suitable interface 7 for that purpose, located in the same integrated circuit, so that the information of this memory or a part thereof can be transferred in a contactless manner to a transmitter/receiver that is located at a relatively great distance. During this transfer, the feeding energy for the part 7 of the electronic circuit that enables transfer is also transferred in contactless manner from the transmitter/receiver via the coil or the anntenna 4 to the card. Optionally, the coil can be connected to a capacitor 5, so that a tuned circuit is obtained, enabling more energy to be transferred within the current field strength standards. In this situation, therefore, the microprocessors used cannot function for the reasons mentioned, and encryption and decryption of the data, which may be encoded, cannot take place. If the hybrid card according to the invention is used as a debit card, i.e., prior to use an upgrading must take place, then this can be effected by applying the card to a terminal which is provided with an interface according to ISO 7816, i.e., with contacts, or to a terminal with a contactless interface 3 according to the new standard ISO 10536 yet to be established.

In such a terminal, the microprocessor in the card does become activated and data information can be written in the memory of the card through data encryption and decryption, for instance by one

of the above-mentioned methods. Of course, it is also possible in this manner to write data information that has not been encrypted in the memory of the card. If the card is subsequently applied to a check or recognition system that functions at a greater distance, then part 7 of the electronic circuit in the card is activated and the data information of the memory 8 or of a part thereof is transferred in contactless manner via coil 4 to the receiver of this system.

In principle, it is also possible to use the microprocessor or a part thereof for the transfer of data information over a greater distance. Since this data information transfer takes place at relatively low frequencies of, for instance, 120 kHz, in contrast to clock frequencies of, for instance, 5MHz with normal microprocessor fucntions, the microprocessor is then set in a so-called low power mode, in which the data information transfer occurs slowly and with little energy consumption. In the block diagram of Fig. '1, therefore, the microprocessor functions can also be divided between blocks 6 and 7. To provide for better separation between the memory parts of the memory 8 and to prevent interference between the functions "identification at a larger distance" and "smart card" at a very small distance, the memory can be designed as a so-called dual port memory, with the memory cell proper being accessible from two sides via separate electronic circuits, whilst these access circuits do not influence each other.

The memory of the chip card can consist of a so-called EEPROM (Electrical Erasable Programmable Read Only Memory), which is capable of saving the data information without the memory cell receiving electrical feed. In such a memory, as with programmable identification tags, data information can also be written in contactless manner. This, however, can only be done at a small distance of a few centimeters because it requires more energy than does reading out these memory cells.

## Claims

1. A chip card with contacts according to standard ISO 7816 and/or a contactless chip card according to standard ISO 10536 yet to be established, said chip card comprising an integrated electronic circuit with at least a memory and a microprocessor, characterized in that, in a first mode, data information from the memory or a part thereof can be read out at a relatively great distance via a contactless electromagnetic route, with only a part of the integrated electronic circuit being activated with a very low energy consumption, so that a sufficient contactless energy supply is possible at this distance, whilst, in a second mode, the data information of the same memory can be read out and written via the normal standardised operating mode of the chip card by the microprocessor present in the integrated electronic circuit of the chip card.

2. A chip card according to claim 1, characterized in that, for the data information transfer over a greater distance, the microprocessor, or a part thereof, present in the integrated electronic circuit is usable in a so-called low power mode, with the clock frequency of the microprocessor being reduced considerably.

3. A chip card according to one or both preceding claims, characterized in that the memory or memory part accommodating the data information is designed as a dual port memory.

4. A chip card according to one or more of the preceding claims, characterized in that the memory, or a part thereof, whose data information can be read out over a relatively great distance via a contactless electromagnetic route, can also be written in contactless manner, albeit at a slighter distance of a few centimeters because writing data information in programmable memories requires more enery than does reading out the data information of these memories.

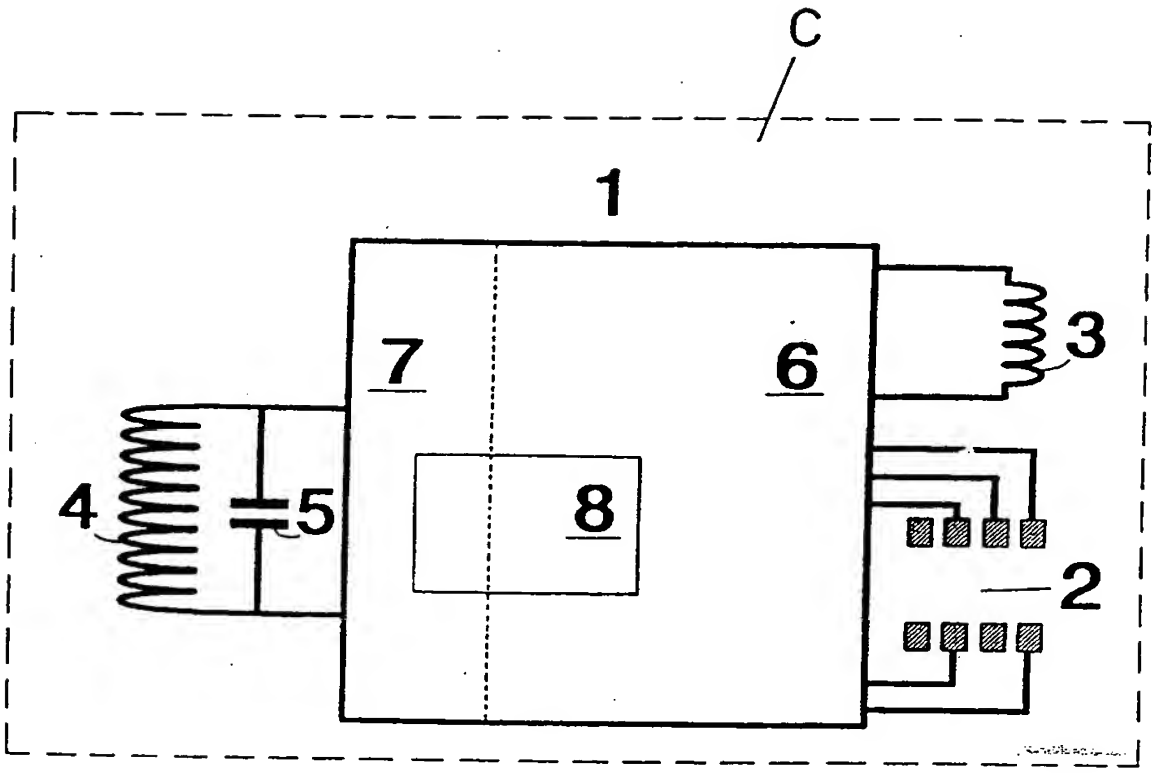


FIG. 1

European Patent Office

# EUROPEAN SEARCH REPORT

Application Number
EP 92 20 2927

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl.5) |
|---|---|---|---|
| A | FR-A-2 655 737 (SGS THOMPSON MICROÉLECTRONICS SA, FRANCE)<br>* claim 1 *<br>--- | 1 | G06K19/06 |
| A | PROCEEDINGS IEEE 1987 CUSTOM INTEGRATED CIRCUITS CONFERENCE May 1987, PORTLAND, OREGON<br>pages 684 - 686<br>NOLAN AND SIEMIATKOWSKI 'a radiation powered single chip eeprom id code transceiver'<br>* hele artikel *<br>--- | 1,4 | |
| A | EP-A-0 309 201 (HITACHI MAXELL)<br>----- | | |

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

G06K

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 02 NOVEMBER 1992 | VEEN G.E. |

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